Oxytropis nana Nutt., a Wyoming endemic collected by Thomas Nuttall on his journey across Wyoming in 1834

WYOMING NATIVE PLANT SOCIETY
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Treasurer's Report - Balance as of May 11, 1990: $153.79; deposits: dues $99.00, T-shirt sales $12.00, scholarship fund $60.50; disbursements: newsletter printing $14.64; new balance as of October 15, 1990: $310.65. RD

Annual Meeting - The annual meeting was called to order by Vice-President Ernie Nelson at Post Creek Picnic Ground in the Big Horn Mountains at 8:40 am on July 21, 1990. Eleven persons were in attendance. The following officers were elected for the coming year: President - Neil Snow, Vice-President - Nancy Kastning, Secretary-Treasurer - Robert Dorn, Board Member - Mary Neighbours. Hollis Marriott is the carryover Board Member. No unfinished or new business was brought up. Next year's meeting was scheduled for the Big Horn Canyon - Pryor Mountains area around June 20. Jerry Mastel moved to adjourn the meeting, seconded by Jennifer Whipple, approved unanimously. RD

Book Review

Colorado Flora: Eastern Slope by William A. Weber, 1990, xxxvi + 396 pp. + 101 pp. of line drawings + 32 pp. of colored plates, University Press of Colorado, P. O. Box 849, Niwot, CO 80544, Cloth $32.50, Paper $19.95.

Bill Weber has completed an up-to-date synthesis of the Colorado flora with this new book which compliments his recent Colorado Flora: Western Slope. The new Eastern Slope book covers nearly 2/3 of the state and adds some features not found in the Western Slope book, namely sections on How to Collect and Preserve Botanical Specimens, Plant Identification, How to Use the Keys, and Some Basic Terminology. The Introduction provides a discussion of the physiography and floristic elements found on the eastern slope along with special habitats and characteristic plants. The text is like that in the Western Slope book with bracketed keys. Families are arranged alphebetically in the three major groups of Ferns and Fern Allies, Gymnosperms, and Angiosperms. Subspecies and varieties are included but possibly not in every case. The line drawings are all together on 101 pages following the keys and are referenced in the keys. Sixty-four colored plates are included in two groups and referenced in the keys. Some of the colored plates are a bit dark, and more of the common and showy wildflowers might have been better to include rather than the pictures of paper birch, willows, and the Ipomoea root. Six or so traditional families are split into additional families, which can be justified to some extent. More questionable is Weber's generosity with genera. Most users with any previous knowledge of plant names will likely be disappointed with the many segregate genera that are recognized. Although this issue is extremely complex, a review would be incomplete without addressing it. One must refer to Weber's Western Slope book to acquire a better understanding of why he chose to recognize these segregate genera.

Weber quotes from Davis and Gilmartin, "species concepts have evolved to the point that morphology is now considered one of the weaker criteria of 'true' speciation. In adhering to a biological species concept the significance of morphological change in the speciation process can be trivialized on definitional grounds." He then adds his own view that, "The same may be said of generic concepts." That is a faulty assumption in my view because there is a major fundamental difference between the rank of species and the rank of genus. The species is the basic taxonomic unit, the genus is not. Weber also states that, "we must remember that a scientific name is a concise expression of a point of view, and that taxonomists are as entitled to differing opinions as any other scientists." One cannot disagree too strongly with the statement by itself. Disagreement arises in how this entitlement is put to use. Weber apparently has forgotten that the original reason for plant names was simply for communication, not for expressing opinions. I don't believe that a book such as Colorado Flora is the place to offer one's differing opinions unless they are backed up by justification from experimental evidence or other research or a direct reference to that evidence. Weber does discuss the importance of modern biosystematic research, but he cites none to back up his opinions. Rather, he falls back on the opinions of 18th, 19th, and early 20th century botanists who based their decisions on a knowledge of the flora that was much inferior to our own. Those pioneering days are gone forever in North America. I (and apparently most other botanists in the region) must agree with

Arthur Cronquist, "Since the rank is not inherent in supraspecific groups, it is only by giving some weight to custom that any stability in the taxonomic scheme can ever be achieved. A good operating principle is to maintain the existing classification whenever it can be defended on natural grounds, and to avoid changing the rank of groups if no significant change in the concept of their relationship to each other and to other groups is involved" (The Evolution and Classification of Flowering Plants, 1968, p. 31). Furthermore, the International Code of Botanical Nomenclature "aims at the provision of a stable method of naming taxonomic groups, **avoiding** and rejecting the use of **names which may** cause error or ambiguity or **throw science into confusion**" (from Preamble, emphasis mine). "The only proper reasons for changing a name are either a more profound knowledge of the facts resulting from adequate taxonomic study or the necessity of giving up a nomenclature that is contrary to the rules" (from Preamble). In nearly all cases, Weber has not demonstrated either of these. If taxonomic ranks are so important, then why has he not gone back to a phylogenetic rather than alphabetic arrangement of the families and genera? Welsh (A Utah Flora, p. 2) sums it up in one sentence, "Some will wish to dissect the genera into ever smaller units, based on various tangible and intangible features, as if such restructuring was of tremendous importance." The debate will likely continue.

Despite the inconvenience of these segregate genera, Weber's new book is otherwise perfectly useful. At least partial synonymy is provided so that if one wishes to use more generally accepted names, it is possible to do so by referring to other floras in the region or to Harrington's Colorado Manual to get the complete names and spellings.

A few other shortcomings were noted. Typos are relatively few and mostly insignificant. The Glossary page number (just above figure on p. xxxi) was not inserted in the final draft, one of those things all authors worry about and hope doesn't happen. On page 287 under Ipomopsis, Verne Grand should be Grant. On page 287, the number in parentheses in lead 1b. of the Ipomopsis key should apparently be (5) rather than (8). On Plate 35, an "o" is missing in coloradoensis. On page 312 under Trautvetteria, an "i" is missing in caroliniensis. In Figure 63, the "C" is missing on the plate. Some errors were noted. On page xvi, last full paragraph, note that Carex livida is known from both Wyoming and Montana, which are hardly in "boreal North America." On page 46, the Apiaceae have 5 sepals, petals, and stamens, not 4. On page 179, Tithymalus montanus should be T. robustus. Euphorbia montana Engelm. was a later homonym of E. montana Raf. Euphorbia robusta dates from 1897, 9 years before Tithymalus montanus, so the epithet robusta must be used when the two are combined. On page 238, the original spelling of pennsylvanica (Fraxinus) has two n's. On page 242, "O. caespitosa ..." should be deleted from key lead 2a. On page 290, the authors for Phlox pulvinata are (Wherry) Cronq. On page 313, Frangula alnus has never been in the alder genus Alnus as the synonym indicates but should rather be Rhamnus frangula. On page 319, the authors for Oreobatus deliciosus should be (Torrey) Rydb. On page 329, the authors for Salix lucida ssp. caudata and ssp. lasiandra should be (Nutt.) Murray and (Bentham) Murray, respectively. The term "endemic" is either used rather loosely or in error. One would assume "endemic to Colorado" but Harbouria trachypleura (p. 50), Grindelia subalpina (p. 87), and Eriogonum exilifolium (p. 294) all occur in Wyoming.

It appears as if Weber does not possess a copy of the most recent International Code of Botanical Nomenclature, or earlier versions for that matter, or else he has not studied them. The basionym of Descurainia richardsonii is illegitimate (Art. 32, Ex. 3) requiring a new name. The gender of Melilotus was fixed as masculine (Art. 76.1) so the correct spelling is Melilotus albus. The basionym of Alyssum minus is illegitimate (Art. 45, Ex. 1) requiring a different name. Weber's simplifying of author citations involving "ex" is contrary to the Code (Art. 46.3). One also wonders how well he has checked the botanical literature. Under Gastrolychnis kingii he states that, "there has been no serious revision recently ...." Does he consider Bocquet's 341 page revision in 1969 not serious or not recent, or has he lost communication entirely by using the genus name of Gastrolychnis? Schrader's publication of Eritrichum was not valid. The earliest validation used the spelling Eritrichium, correctly given in Index Nominum Genericorum. Astragalus lonchocarpus, clearly mapped on the eastern slope in Barneby's Atlas, is not included in his book.

Despite the inconveniences and errors in the book, we are fortunate that Weber has put in writing his 43 years of experience with the Colorado flora so that all of us might benefit from it. The University Press of Colorado is to be commended for making the book available at a reasonable price. It is a bargain even for those with only a peripheral interest in plants. RD

See included flyer for WNPS member discount for this book.

Wyoming Plant Families - Plants are classified using a hierarchy of categories. The highest category is Kingdom which includes all plants. The Plant Kingdom is contrasted to the Animal Kingdom. Under the Plant Kingdom are a number of Divisions. Examples are Division Fungi which includes mushrooms and molds, Division Polypodiophyta which includes ferns, and Division Magnoliophyta which includes the flowering plants. There are around 17 divisions in the Plant Kingdom, but Division Magnoliophyta (flowering plants) accounts for over half of all species in the entire Plant Kingdom. Each division is divided into Classes. Division Magnoliophyta contains only two classes, Class Magnoliopsida and Class Liliopsida, commonly known as dicots and monocots. Each class is divided into Orders, and each order is divided into Families. When attempting to identify the higher plants, one normally starts with the family. The higher categories listed above are generally irrelevant with respect to identification. Each family is divided into Genera, and each genus is divided into Species. The species is the basic unit for classification. Looking at classification from the bottom up, a group of related species constitutes a genus, a group of related genera constitutes a family, a group of related families constitutes an order, and so on up to kingdom. All the main categories can be further subdivided, so we can have Subkingdom, Subdivision, Subclass, Suborder, Subfamily, Subgenus, and Subspecies. These in turn can be subdivided yielding categories like Tribe, Section, and Variety.

Many amateurs are interested in being able to identify the higher plants but are overwhelmed by the number of species, nearly 2400 in Wyoming alone. The higher animals can be learned one at a time because there are not very many (about 117 mammals, 400 birds, 34 reptiles and amphibians, and 78 fish in Wyoming). To learn the plants in this manner is inefficient and often frustrating. It is much easier to first master the higher categories such as family, of which there is a manageable number (120 in Wyoming). In fact, it is even easier than it first appears since, in Wyoming, two families account for 25 percent of the species, six families account for 50 percent of the species, and eighteen families account for 75 percent of the species. Being able to recognize only 20 families means that 8 out of every 10 species can be placed in a family. Once these few families are mastered, then one can work on the genera in each family and ultimately the species in each genus.

This new series in the newsletter will look at the major families of higher plants in Wyoming with an aim at providing a means to master the 20 or so families that account for 80 percent of the species. Two families will be covered in each newsletter. Since the newletters appear largely outside the growing season, it will be best to save each newsletter until summer and take them into the field where living plants can be studied directly. This gives six families to work with the first summer which will account for 1 of every 2 species. Those living outside Wyoming can participate as well, since these same families tend to dominate the vegetation over much of North America.

Family 1: Asteraceae (alternate name: Compositae), Sunflower Family

This is the largest family of flowering plants in Wyoming and probably in the world. In Wyoming there are about 400 species. Included are common plants like the dandelion, sagebrush, aster, thistle, daisy, sunflower, goldenrod, coneflower, and ragweed. In this family, what is commonly called a flower by the layman is really an aggregation of many flowers. Refer to the sunflower in Figure A. The twelve rays radiating from the center are each individual flowers, one of which is shown in detail in Figure D and is called a ray flower. At the center in Figure A is an aggregation of disk flowers better seen in the sectional view of Figure B and as a single individual in Figure E (details may be slightly different in sunflower). The dandelion has only ray flowers while the sagebrush has only disk flowers. They all have one thing in common, a series of involucral bracts enclosing the flowers (see Figure C) called collectively the involucre. The common term "sunflower seed" really refers to the fruit of a single flower in a sunflower head (collective term for involucre and the enclosed flowers). The technical term for this kind of fruit is achene. Note that the achene is borne below the corolla (collective term for petals) so is considered inferior (below corolla). [Fruits enclosed by the corolla are considered superior (above base of corolla), but this type of arrangement does not occur in this family.] One other characteristic is important in the family. The stamens (pollen bearing male structures, Figure E) are usually 5 in number and usually united to form a tube around the style. In some species the heads contain only flowers with male parts (stamens) or with only female parts (ovary, style, stigmas). In other species the ray flowers may have parts from only one sex while the disk flowers have both. In a few species some of the flowers (especially the rays) may be neither male nor female but neutral. In summary, the three characteristics that separate this family from our other families are (1) involucre enclosing several to many flowers, (2) inferior ovary (which becomes the achene), (3) anthers generally 5

and usually united to form a tube. Find a sunflower or aster, a dandelion, and a sagebrush and study the differences in flower structure (asters and sagebrush generally flower in late summer). Look for other species that belong to this family.

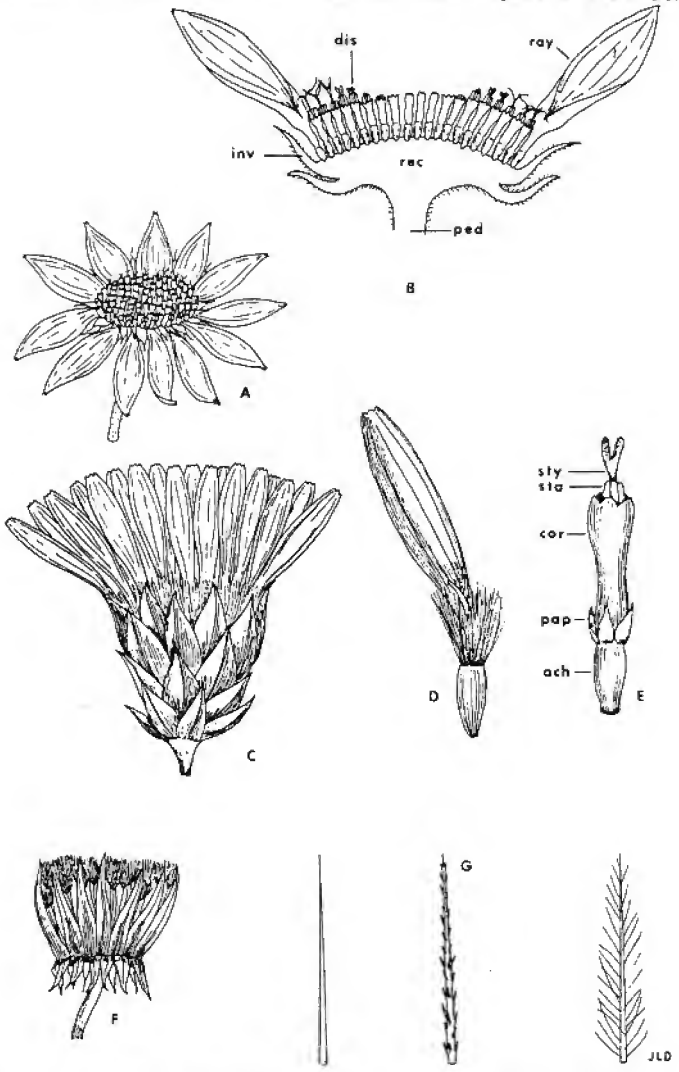

Figure. Asteraceae. A. Head of Helianthus (x 0.7). B. Longitudinal section of head (x 1.4): ray = ray flower, dis =disk flower, rec = receptacle, inv = involucral bract, ped = peduncle. C. Pressed head of Aster with involucral bracts imbricate (x 3). D. Ray flower (x 4) with a pappus of bristles. E. Disk flower (x 5): ach = achene, pap = pappus (of scales), cor = corolla, sta = stamens, sty = style. F. Head of Taraxacum in fruit with biseriate involucral bracts (x 1). G. Capillary bristles (x 9): smooth at left, barbed at center, plumose at right.

Family 2: Poaceae (alternate name: Gramineae), Grass Family

This is the second largest family of flowering plants in Wyoming with about 225 species, and, in terms of number of individual plants, probably the largest and most widespread family in Wyoming and in the world. The economic importance is obvious when we consider wheat, oats, barley, rye, corn, and forage grasses. Nearly everyone can recognize a grass with the narrow "grass-like" leaf blades such as we see in our lawns. The main problem is excluding the look-alikes that are not grasses. These will be mostly sedges. The grass flower is usually subtended by 2 to 4 chaffy bracts and the grass stem is round or flattened. Sedge flowers are usually subtended by a single bract and the sedge stem is often triangular. Most sedges are found in moist or wet places. Since grass flowers are not particularly showy and a special terminology is needed for identification to species, beginners are advised to stop with the family and save species identification until after the easier groups of plants are mastered. As an alternative, some of our most important forage grasses can be learned individually (see figures). These are blue grama (Bouteloua gracilis),

smooth brome (Bromus inermis), western wheatgrass (Elymus smithii or Agropyron smithii), Indian ricegrass (Oryzopsis hymenoides), timothy (Phleum pratense), Kentucky bluegrass (Poa pratensis), and needle & thread (Stipa comata). Find some grasses in flower and examine the flower parts to try to identify stamens, ovary, and stigmas. Examine the grass leaf and identify the sheath and ligule (Figures A, B, G). Find a sedge in flower and with triangular stems in a wet place and examine the flower in direct comparison to a grass. Also compare the leaves. RD

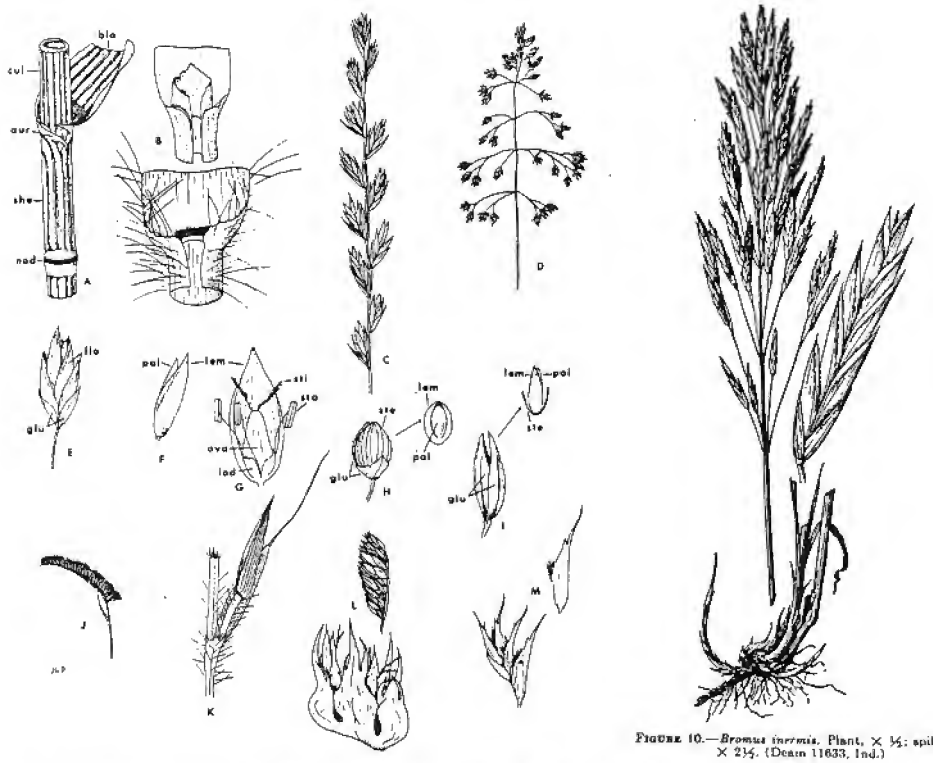

FIGURE 10.—*Bromus inermis*. Plant, × ½; spikelet, × 2½. (Deam 11633, Ind.)

Figure. Poaceae. A. Portion of grass culm (x 3): nod = node, she =sheath, bla = blade, aur = auricle, cul = culm. B. Ligule types (x 6): **Poa palustris** with membranous ligule (above), **Panicum oligosanthes** with hairy ligule (below). C. **Elymus smithii** with sessile spikelets (x 0.7). D. **Poa nervosa** with spikelets on pedicels (x 0.7). E. Spikelet of **Poa nervosa** (x 3): glu = glumes, flo =florets. F. Floret of **Poa nervosa** (x 4):lem = lemma, pal = palea. G. Grass flower (x 7): lem = lemma, ova = ovary, sta = stamen, sti =stigma, lod = lodicule. H. Spikelet of **Panicum oligosanthes** (x 4): glu = glumes, ste = sterile lemma, lem = lemma, pal = palea. I. Spikelet of **Phalaris arundinacea** (x 3): glu = glumes, ste = sterile lemma, lem = lemma, pal = palea. J. Spike of **Bouteloua gracilis** with spikelets on one side of the rachis only (x 0.7). K. Pair of spikelets of **Andropogon gerardii** (x 3). L. Staminate (above x 3) and pistillate (below x 4) spikes of **Buchloe dactyloides**. M. Spikelet (left) and floret (right) of **Monroa squarrosa** (x 3).

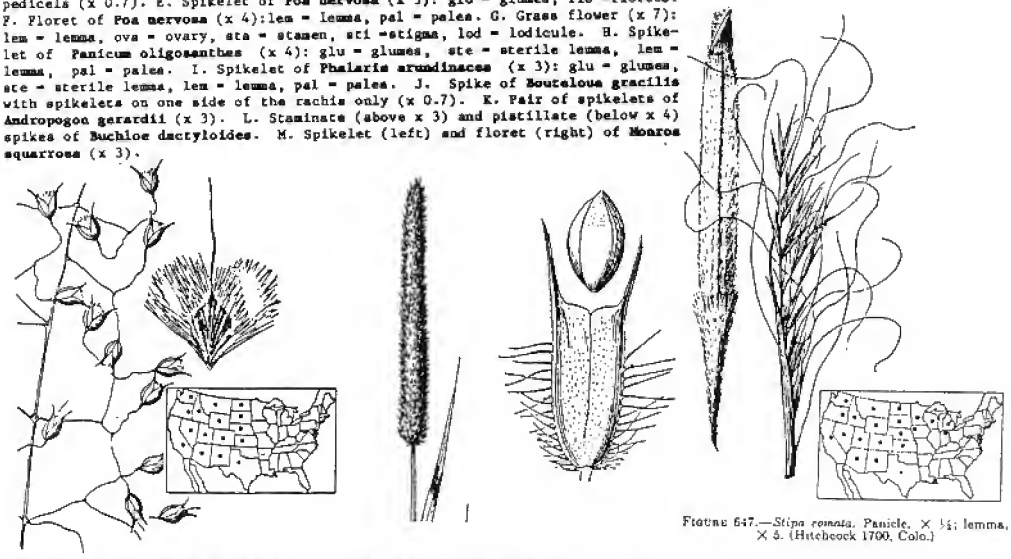

FIGURE 647.—*Stipa comata*. Panicle, × ½; lemma, × 5. (Hitchcock 1700, Colo.)

FIGURE 638.—*Oryzopsis hymenoides*. Panicle, × 1; floret, × 5. (Mearns 2583, Wyo.)

FIGURE 516.—*Phleum pratense*. Plant, × ½; glumes and floret, × 10. (Mearns 2209, Wyo.)

Species figures are from Manual of the Grasses of the United States by A. S. Hitchcock, revised by Agnes Chase, 1950. The other figures are copyrighted in Vascular Plants of Wyoming by R. D. Dorn, 1988.

Contributors This Issue - RD = Robert Dorn, MN = Mary Neighbours.

Wyoming Native Plant Society T-shirts - We would like to print up another design for WNPS t-shirts. Can you draw a new design of a native Wyoming plant? The current design and ordering information is given below. Make checks payable to Mary Neighbours and order directly from her. MN

Name & Mailing Address

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Local phone: _____

Cost: $10.00 per shirt
$2.40 per shirt for mailing

T-shirts have short sleeves, are 100% preshrunk cotton, and will not shrink especially if washed in cold water.

Colors: Blue and green on cream background with black writing.

Sizes: S (34-36) _____

M (38-40) _____

L (42-44) _____

XL (46-48) _____

Total number: of shirts _____

Amount due: (Total X $10.00) _____

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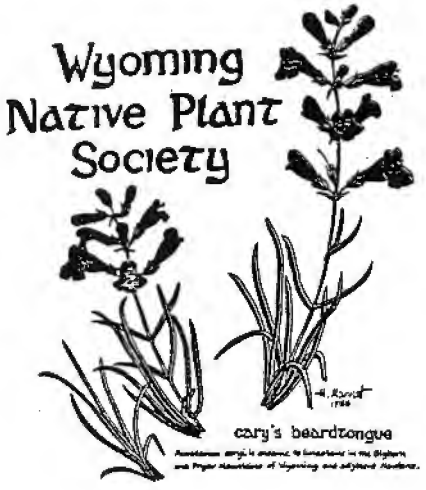

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